Food Detection using Deep Learning

Omar Resendiz, Karthik Gopan, Mariela Ramirez,

Chujie Guan, and Jordan Rider

Mentors: Professor Marco Tacca, and MAXIM Rep. Brian Rush

Abstract

As technology continues to advance, the various applications of image recognition and processing continue to prove their value. Some of the important applications of image processing in the field of science and technology include computer vision, face detection, augmented reality, X-rays, and Ultrasonic scanning. This project uses a MAX78000FTHR board to detect various types of food with the use of a convolutional neural network. The final objective for this project is to create an AI neural network that can identify foods from images taken by the camera on the MAX78000 feather board. The program must run on the board itself, with the output being shown on a computer terminal. For this project we need to create and train a neural network from a data set of food images, synthesize the neural network and verify functionality, run a trained model on MAX78000FTHR board, and create documentation for the project. The neural network must be able to identify at least 10 different food types from various angles. Must be able to identify foods using the integrated camera on the MAX78000. Output results to the terminal on the host computer/or on the onboard screen that was soldered on. We have prepared our MAX78000FTHR board to use an LCD display. A neural network has been created to train off of a data set that is scaled to 128x128 and artificially expanded through image augmentation. We expect to have a finalized neural network achieved by the end of this semester, and the next semester we will be adjusting it to fit on the MAX78000. The results we expect to achieve are to create a machine learning AI using pytorch and modified MAXIM code to identify at least 10 different foods from various angles, and to have the LCD show the camera feed and label the food item shown (either what food it thinks it sees or “unknown” for things that aren't in the data set.